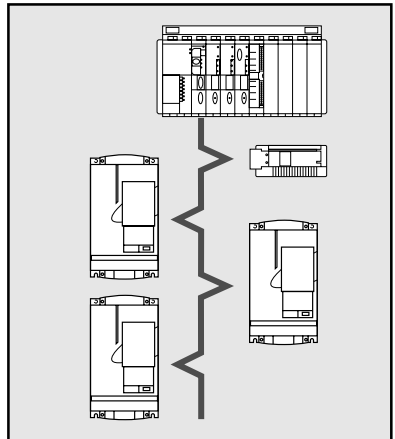


Altivar 58 Telemecanique

Guide d'exploitation
User's manual

Carte de communication
protocole Interbus-S
Communication card
Interbus-S protocol

VW3-A58304
VW3-A58304E



GROUPE SCHNEIDER

Carte de communication protocole Interbus-S

Page 2

Communication card Interbus-S protocol

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When the speed controller is powered up, the power components and some of the control components are connected to the line supply. *It is extremely dangerous to touch them. The speed controller cover must be kept closed.*

After switching the ALTIVAR off and after the green LED is off, *wait for 3 minutes before working on the equipment.* This is the time required for the capacitors to discharge.

Although every care has been taken in the production of this document, Schneider Electric SA cannot guarantee the contents and cannot be held responsible for any errors it may contain or for any damage which may result from its use or application.

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Hardware setup

Presentation

The Interbus-S **VW3-A58304** or **VW3-A58304E** communication card is used to connect an Altivar 58 speed controller to Interbus-S networks.

Data exchanges enable all functions of the Altivar 58 to be used :

- function configuration,
- remote downloading of settings,
- control and supervision,
- monitoring,
- diagnostics.

The card manages the Interbus-S communication protocol.

The card has two 9-pin SUB-D connectors : male and female. These two 9-pin SUB-D connectors are used for daisy-chaining the Interbus-S network (1 "IN" and 1 "OUT" port)

The connection cable for the Interbus-S network must be ordered separately.

Consult the attached user's manual "**Internal Communication Variables**" which details :

- the speed controller control process using a serial link with the "Drivecom 21" profile,
- all Altivar 58 internal variables.

Supply:

- The VW3-A58304 card is supplied through the speed controller.
- The VW3-A58304E card contains 2 additional screw terminals for an external 24 V DC supply. It is not supplied through the speed controller.

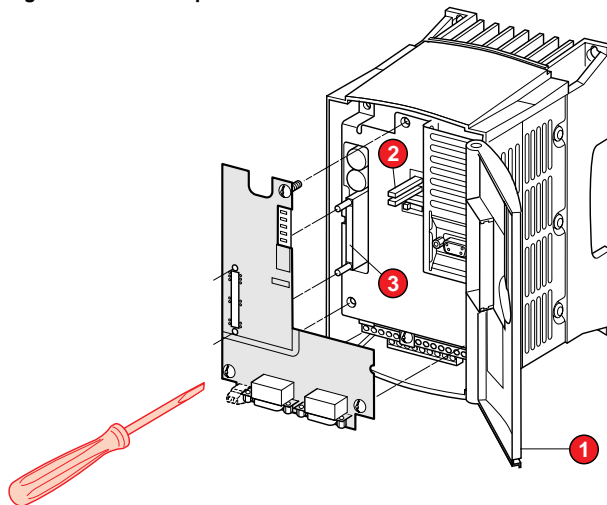
Hardware setup

Installing the card

Receipt

- Ensure that the card reference printed on the label is the same as that on the delivery note corresponding to the delivery advice.
- Remove the packaging and check that the option card has not been damaged in transit.

Installing the card in the speed controller

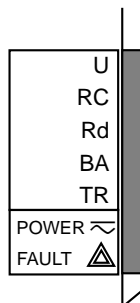


Mounting precautions

- Ensure that the speed controller is powered down.
- Check that there is no voltage on the DC bus : green LED **2** (POWER) off and wait 3 minutes after powering down.
- To access the slot for mounting the option card, unlock the protective cover **1** and pivot it.
- Place first the 50/60 Hz switch in the position corresponding to the motor as indicated in the speed controller user's manual.
- Remove the flexible protective cover from the control card support.
- Mount the option card on the control card support by plugging it into connector **3** under the protective cover and fix it using the three screws.

Positioning the label:

Fix the supplied self-adhesive label to the card, on the cover of the Altivar 58 as shown opposite.



Hardware setup

Connecting to remote Interbus-S

Male SUB-D connector pin configuration

The transmission interface is electrically isolated from the speed controller in accordance with standard RS 485. It is available on a 9-pin SUB-D connection.

Male 9-pin SUB-D - Input

Pin	Signal	Pin	Signal	Pin	Signal
1	DO1	4	NC	7	DI1/
2	DI1	5	NC	8	NC
3	GNDI	6	DO1/	9	NC

Female SUB-D connector pin configuration

Female 9-pin SUB-D - Output

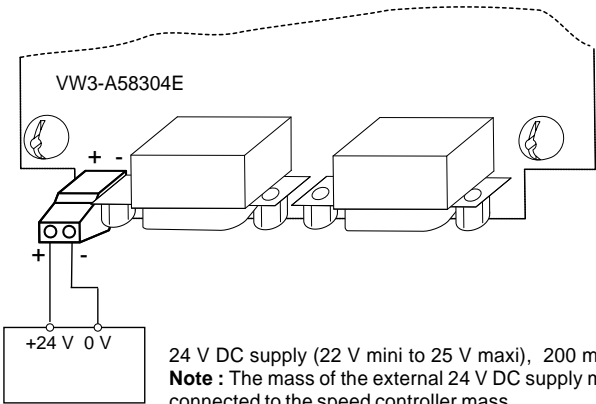
Pin	Signal	Pin	Signal	Pin	Signal
1	DO2	4	NC	7	DI2/
2	DI2	5	VCCO	8	NC
3	GNDO	6	DO2/	9	RBST

Connecting to standard RS 485 bus

Recommendations on a standard RS 485 bus

- use the Phoenix Contact cable ; reference IBS RCBxxxM
xxx = length of cable in m,
- maximum length of line : 13,000 metres,
- maximum length of drop cable : 400 metres,
- do not connect more than 256 stations to one bus,
- cable routing : keep the bus away from the power cables (at least 30 cm),
with any crossovers at right angles.

External supply for VW3-A58304E card



24 V DC supply (22 V mini to 25 V maxi), 200 mA mini

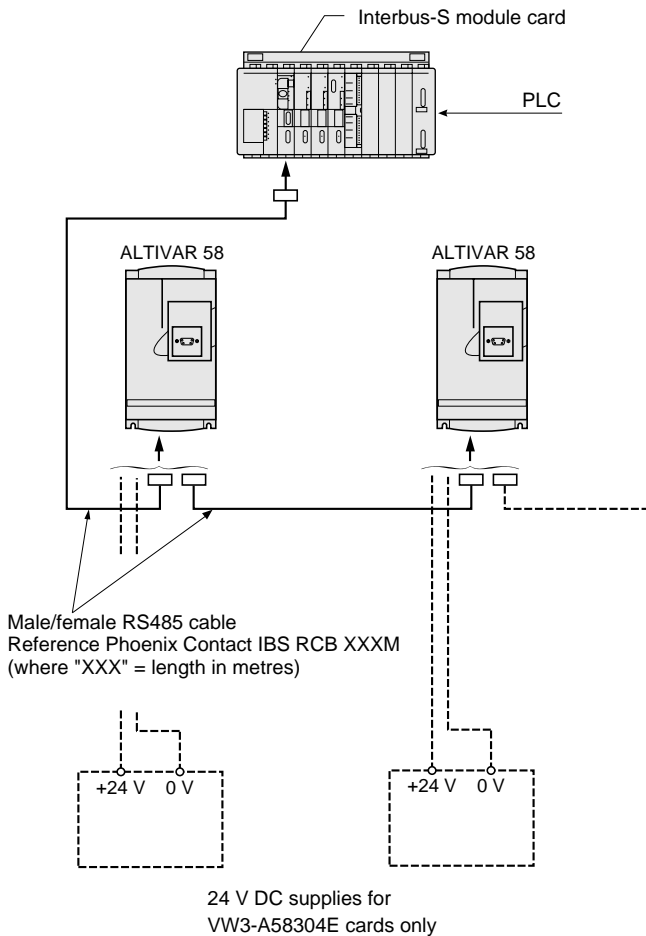
Note : The mass of the external 24 V DC supply must systematically be connected to the speed controller mass.

Hardware setup

Example of connection to remote Interbus-S :

Note :

The network has a ring topology; transmission speed is 500 kbits/s.



Configuration of the communication functions

Initial power-up

The Interbus-S card is automatically recognised by the Altivar 58 on initial power-up. The card gives access to configuration menu "8 - COMMUNICATION" from the display module (or programming terminal or PC software).

Configuration

Select menu "8 - COMMUNICATION" to access the Interbus-S configuration parameter. This menu is used to configure the single communication parameter.

The parameter value **AdrC** appears. The parameter must be set to 1 to enable transmission of data from the bus to the speed controller.

It is used to perform modifications within the speed controller without interference from the bus or interruption of communication on the bus.

AdrC = 0

The speed controller requests independence from the bus and the card communicates on the bus via a limited number of services. In this status the card exchanges process data and messages with the bus, but does not send them to the speed controller.

This status can be verified by a STATUS service. The "logical status" parameter in the reply is equal to 2 = L_STAT_NBR_SVC_LIMIT.

With the independently supplied VW3-A58304E card, it is possible to break the power supply of the speed controller.

AdrC = 1

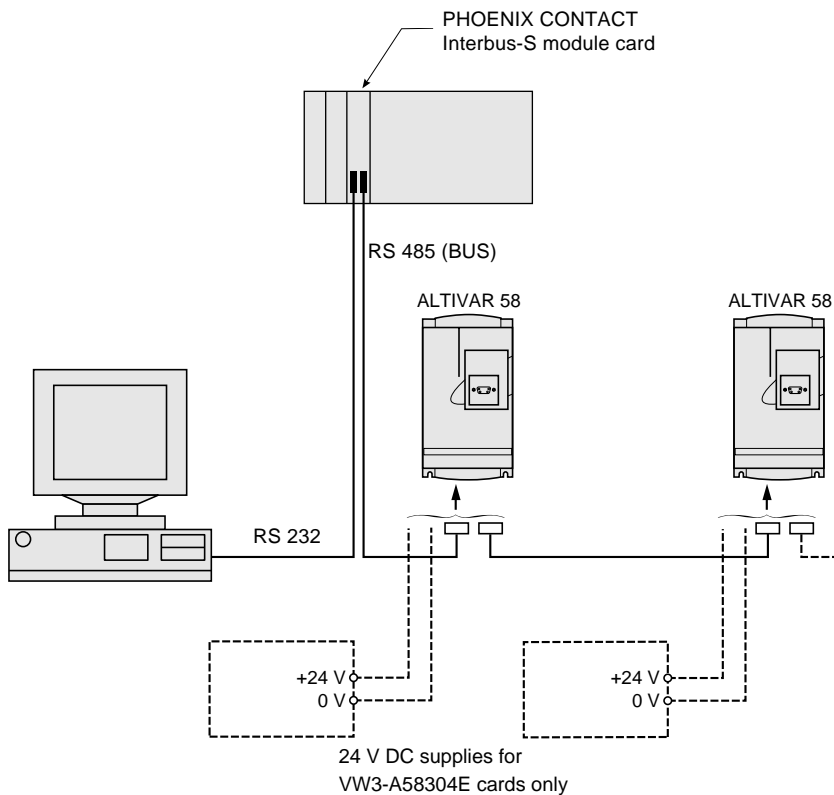
The Interbus-S card sends process data and messages from the bus to the speed controller. This status represents normal operation and can also be verified by a STATUS service. The "logical status" parameter in the reply is in this case equal to 0 = L_STAT_COMM_READY.

The second parameter **Pro** = "INTERBUS-S" indicates that the card has been recognised but cannot be configured.

Software Setup

Installing the environment

- The Interbus communication card must be configured for use by the hardware and connected to a programmable logic controller.
- The communication bus must be connected to the card.
- The card is connected to a PC with Phoenix Contact CMD software via an RS 232 serial link.
- A VW3-A58304E card must be independently supplied in 24 V DC.



- The card is configured using CMD software with PHOENIX CONTACT documentation.
- The program is written in the PLC in accordance with the previously defined configuration and the card is considered to be a standard I/O interface.

Setting up an ATV58 speed controller with IBS PC software

This section describes the procedure specific to the ATV58 to facilitate setup for a user who is familiar with **Phoenix Contact IBS CMD G4 > V4.3** software (English version).

• **"Device Description" of the ATV58 speed controller**

Device Number :	automatic
Group Number :	
Station Number :	
Device Name :	ATV58 Profile 21 (RB)
Manufacturer Name :	Schneider Electric
Device Type :	ALTIVAR 58
Order No :	Undefined
Ident Code :	227 (dec)
Profile Number :	21 (hex)
Process Data :	32 bits
Parameter Channel :	1 word
CR :	automatic
Interface Type...	
Incoming Interface (IN1) :	remote
Outgoing Interface (OUT1) :	remote
Icon...	DRIVECOM 227
Parameter Channel...	
Message Lengths	Transmit : 128
	Receive : 128
Supported Parameter Channel Services	Read code : 80 30 00
	Write
	Get-OD (long format)

• **Inserting an ATV58 in a project using the automatic read function for the bus configuration : *Read again***

The *Read again* function automatically recognises the ATV58 as a speed controller which conforms to the DRIVECOM 21 profile (RemoteBus) with the identification code 227. Right-click on the icon and from the menu choose *Description*. Next click on the *Parameter Channel* button, change the *Message Lengths Transmit* and *Receive* parameters to 128 bytes and add the Get-OD service to the *Supported Parameter Channel Services* list.

Software Setup

• Inserting an ATV58 in a project using the Edit/Insert with Device Description function

The Schneider Automation (ASA) *.mbd catalogue is located in the C:\IBSCMD\BIN directory and the icons specific to Schneider devices are located in the C:\IBSCMD\PICTURE directory.

Select : *Data Source* : Other, External_Device_Database,
 Group : SE and *Search* button
 Output : Type ALTIVAR 58, OK

If you do not have the Schneider catalogue and icons file :

Select : *Data Source* : Internal Database
 Group : DRIVECOM and *Search* button
 Output : Type Profil 21 (RB), OK

The bookmark for the description appears. Click on *Parameter Channel*, change the *Message Lengths Transmit* and *Receive* parameters to 128 bytes and add the Get-OD service to the *Supported Parameter Channel Services* list.

After you have edited all the devices you wish to add to the project, the next step depends on whether or not the *controller board* contains a parameter memory.

If it does, click on *Parameterization Memory* and *Save*. The board must have been previously formatted using *Format*.

If not, right-click on the *Controller Board* icon, then *Parameterization*, *Execute*.

The CMD software switches to *Online* operating status in both cases following successful parameterization. If you wish to access the ATV58 via message handling before switching to *Monitoring* operating status, right-click on the *Controller Board* icon, then *Control*, *Other...* and select messages, beginning with an *INITIATE* service.

If you are already in *Monitoring* operating status, and return to send messages to the speed controller, the communication link is already established and it is not necessary to send an *INITIATE* service.

In *Monitoring* operating status the speed controller can be controlled using *DRIVECOM Monitor* and *Digital Process Data Monitor*.

For more details on using the IBS CMD G4 software, see the Phoenix Contact user's manual (reference: IBS CMD SWT G4 UM E).

Interbus-S protocol

Principle

The Interbus-S protocol is a communication protocol which creates a hierarchical structure (one master and one or more slaves).

It is used to interrogate one or more intelligent slaves from the master. A multidrop link connects the master and the slaves.

The master manages the exchanges and has sole responsibility for them. The master repeats the question when an incorrect exchange occurs and declares the interrogated slave absent when there is no reply within the given time. No slave may transmit a message without having been polled.

Interbus-S protocol uses two types of data exchange between master and slave

Periodic exchange

The Interbus-S card supports two input periodic words and two output periodic words.

The two input periodic words and the two output periodic words are assigned to the following parameters :

Type of Periodic	Index	Meaning
Input	0x6041	Status word (StatusWord)
	0x6044	Motor speed (SpeedActValue)
Output	0x6040	Control word (ControlWord)
	0x6042	Speed reference (SpeedSetP)

Exchanges via message handling

The maximum length of messages is 128 bytes. Message handling services conform to the Peripheral Communication Protocol (PCP) standard for communication services.

Note :

No direct lateral communication (in other words, slave to slave) is possible. The application software of the master has been designed accordingly to interrogate one slave and send the data received to another slave.

The variables exchanged via message handling are detailed in the "Internal Communication Variables" user's manual. **Interbus-S protocol assigns the control register and the speed setpoint to the output periodic words by default. Message handling must therefore not be used to transmit these commands, as they will be immediately replaced by the next exchange of periodics.**

Accessible data

The two following types of object can be accessed :

- User objects (Index 0x5FE0 to 0x5FFF)
- Drivecom objects (Index 0x6000 to 0x6049)

Control and monitoring

Interbus-S protocol is used to control exchanges.

Management of exchanges between two entities communicating via an asynchronous serial link includes exception responses when exchange malfunctions occur. A slave may receive various inconsistent messages. When this happens, the slave informs the master that it cannot understand and the master decides whether or not to repeat the exchange.

Supported services

The PCP communication services supported by the card are as follows :

Initiate :	Initialises the communication link.
Abort :	Aborts the communication link.
Status :	Speed controller and communication status.
Get-OV :	Reads an object description.
Identify :	Identifies the card.
Read :	Reads a parameter.
Write :	Writes a parameter.

A description of these services and data which may be used by the network master is given in the list of communication links below.

List of communication links (KBL)

This list contains just one element : the Interbus-S card only supports one communication link between a device (server) and the bus master.

A communication link defines data which can be exchanged between two devices by means of the services and transmission/reception buffers.

Both devices must know which services are supported and the length of the buffers .

The communication link of the Interbus-S card is as follows :

Communication reference	2
Max. length of buffer in transmission mode (low priority)	128
Max. length of buffer in transmission mode (high priority)	0
Max. length of buffer in reception mode (low priority)	128
Max. length of buffer in reception mode (high priority)	0
Supported services (client)	00 00 00 _{hex}
Supported services (server)	80 30 00 _{hex}
Maximum number of parallel services	1

Initiate

Used to establish communication on the bus and authorises transmission of other services.

The parameters of this service are as follows :

Object dictionary version	10
Profile number	21 _{hex}
Supported access rights	true
Password	0
Supported group access rights	0

Note :

Sending an INITIATE message when the communication link is already established will stop the communication (equivalent to sending an ABORT message).

Abort

Used to stop communication on the bus.

Software Setup

Status

Used to show the device status. Status comprises three types of data.

Data	Possible values	Meaning
Logical Status	0 2 4	Communication status : Ready to communicate Limited number of services Not ready to communicate
Physical Status	0 2	Speed controller status : Speed controller ready Speed controller not ready
Local details	—	2 bytes : Speed controller fault register 1 byte : not used

Get-OV

Used to show the details of each parameter (Type, etc).

Identify

Used to identify the device.

Identification comprises three types of data :

Name of device manufacturer	SCHNEIDER ELEC.
Name of model	ATV58*****
Device version number	V1.0 (ex)

Read / Write

Used to read or write the value of a speed controller or Drivecom object via its index and subindex.
The Altivar 58 "Internal Communication Variables" user's manual provides the connection between the Index / Subindex and the speed controller or Drivecom object details.

Errors which occur in read / write are indicated by the following codes :

Error class	Error code	Additional code	Meaning
6	7	0	Nonexistent parameter
6	6	0	Request to write an object which can be accessed in read-only mode
5	3	0	Request to write an a parameter in local forcing
8	0	0	No response.

Software Setup

DRIVECOM profile

The Interbus-S card conforms to the DRIVECOM 21 profile and support the following parameters :

INDEX (hex)	Name of parameter	Access rights	Number of elements	Length (byte)	Type of Data	Type of Structure
0x6002	ProcDatEnab : Enabling of periodics	Ra/W	1	1	SIMPLE	OS
0x603F	ErrorCode : Error code	Ra	2	2	SIMPLE	OS
0x6040	Controlword : Control word	Ra/W	2	2	SIMPLE	OS
0x6041	Statusword : Status word	Ra	2	2	SIMPLE	OS
0x6042	SpeedSetP : Speed reference	Ra/W	1	2	SIMPLE	I16
0x6043	SpeedRef : Reference speed	Ra	1	2	SIMPLE	I16
0x6044	SpeedActV : Output speed	Ra	1	2	SIMPLE	I16
0x6046	SpdMinMax : Minimum / Maximum Speed	Ra/W	2	8	ARRAY	U32
0x6048	SpeedAcc : Acceleration ramp	Ra/W	2	6	RECORD	RAMP
0x6049	SpeedDec : Deceleration ramp	Ra/W	2	6	RECORD	RAMP

Characteristic	Possible value	Meaning
Access rights	Ra W	Access in read mode Access in write mode
Type of data	SIMPLE ARRAY RECORD	Simple Variable : Addressing the variable by Index or Index + Subindex = 0. Array Variable : Addressing the entire array by Index + Subindex = 0 Addressing an array element by Index + Subindex not equal to 0. Record Variable : Addressing the entire array by Index + Subindex = 0. Addressing a recorded element by Index + Subindex not equal to 0.
Type of Structure	BS I16 U8 U32 RAMP	Byte String Integer 16 Unsigned 8 Unsigned 32 Ramp (Index 21 _{hex})

Controlling the speed controller - Status machine

For information on controlling the speed controller using the Drivcom 21 profile, refer to the Altivar 58 "Internal Communication Variables " user's manual.

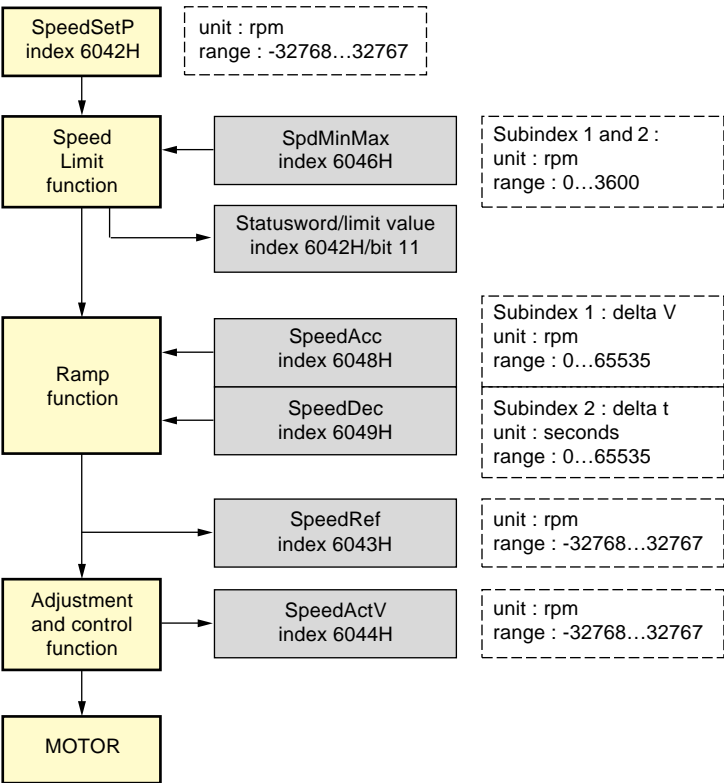
"Controlword" : 6040_{hex}
"Statusword" : 6041_{hex}

Assigning process variables (Periodics)

ProcDatEnab : 6002_{hex}

- This parameter is used to disable the assignment of periodic data to the speed controller when written as 0. In this case, parameters 6040_{hex} and 6042_{hex} may be written via message handling. If not, the written values are immediately overwritten by the next periodic data exchange. The assignment of periodic data to the speed controller is enabled by default (factory setting).

Speed function



Software Setup

SpeedSetP (6042_{hex})

The speed reference is in revolutions per minute (rpm)

Index	Subindex	Type of data	Type of structure	Meaning
0x6042	0	SIMPLE	I16	Speed reference

SpeedRef (6043_{hex})

The reference speed is given in revolutions per minute (rpm)

Index	Subindex	Type of data	Type of structure	Meaning
0x6043	0	SIMPLE	I16	Reference speed

SpeedActV (6044_{hex})

The output speed is given in revolutions per minute (rpm)

Index	Subindex	Type of data	Type of structure	Meaning
0x6044	0	SIMPLE	I16	Output speed

SpdMinMax (6046_{hex})

The minimum and maximum speeds are in revolutions per minute (rpm)

Index	Subindex	Type of data	Type of structure	Meaning
0x6046	1	ARRAY	U32	Minimum Speed
0x6046	2	ARRAY	U32	Maximum Speed

SpeedAcc (6048_{hex})

The acceleration ramp comprises a speed variation, expressed in revolutions per minute and a time variation, expressed in seconds.

Index	Subindex	Type of data	Type of structure	Meaning
0x6048	1	RAMP	U32	Speed variation
0x6048	2	RAMP	U16	Time variation

SpeedDec (6049_{hex})

The deceleration ramp comprises a speed variation, expressed in revolutions per minute and a time variation, expressed in seconds.

Index	Subindex	Type of data	Type of structure	Meaning
0x6049	1	RAMP	U32	Minimum Speed
0x6049	2	RAMP	U16	Maximum Speed

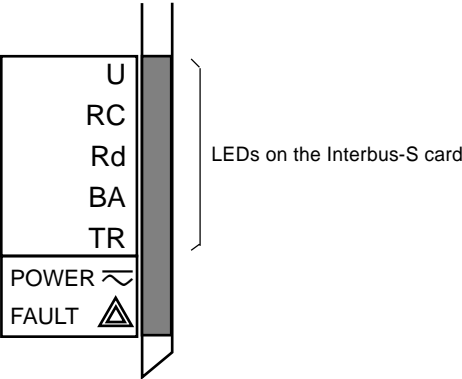
Fault function

ErrorCode (index 603FH)

DRIVECOM error code	Fault abbreviation	description	DRIVECOM profile fault description
0000	NOF	no malfunction	No malfunction
1000	CRF	load relay fault	General malfunction
1000	OLF	motor overload	General malfunction
2320	OCF	motor short circuit fault	Short circuit/short to earth
3110	OSF	mains overvoltage fault	Mains overvoltage
3120	USF	mains undervoltage fault	Mains undervoltage
3130	PHF	line phase failure	Phase failure
3310	OPF	motor phase failure	Output phase failure
3310	OBF	d.c. bus overvoltage	Output overvoltage
4210	OHF	speed controller thermal overload	Overheating device
4310	OTF	motor thermal overload	Overheating motor
5520	EEF	EEPROM memory fault	Memory EEPROM
6100	INF	internal fault	Internal software
6300	CCF	incorrect configuration (parameters)	Data Set
6300	CCI	invalid configuration (parameters)	Data Set
7300	ANF	overhauling fault (with speed feedback)	Sensor
7300	LLF	loss of 4-20mA	Sensor
7300	TSF	PTC probe fault	Sensor
7310	SPF	speed feedback cut-off fault (with speed feedback)	Sensor Speed
7510	SLF	standard communication link fault	Communication Serial Interface no. 1
7520	ILF	fast communication link fault	Communication Serial Interface no. 2
7520	CNF	fast NET communication fault	Communication Serial Interface no. 2
9000	EPF	external fault	External malfunction

Complementary diagnostics

Check the status of the 5 LEDs on the communication card, and visible through the window on the cover of the Altivar 58.



LED	Colour	Meaning	Corrective action for malfunction
U	green	on : The card is energised off : reset card or no power supply	VW3-A58304 card : check that the Altivar is supplied VW3-A58304E card : check that the card is supplied through its independent 24 V DC source
RC	green	on : bus remote input is correctly connected	check the connection
Rd	red	on : bus remote output is not correctly connected	check the connection
BA	green	on : Interbus interface card is transmitting data (Time out = 640 ms)	check that the PLC initialises the bus correctly
TR	green	flashing : message on the bus	check that the communication link is initialised



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